west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

PERMIT MODIFICATION APPROVAL

October 06, 2014

NORTHEAST NATURAL ENERGY LLC
707 VIRGINIA STREET EAST, SUITE 1200
CHARLESTON, WV 25301

Re: Permit Modification Approval for API Number 6101673 , Well #: YOST 3H
Extended lateral, lengthened surface casing by 50'

Oil and Gas Operator:
The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

for Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

GI-01673
MOD

northeast
NATURAL ENERGY

August 21, 2014

WV Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Received
Office of Oil & Gas
AUG 26 2014

Re: Yost 3H (API # 47-6101673)
Permit Modification Application

Dear Permit Reviewer,

Northeast Natural Energy LLC ("NNE") received a Horizontal 6A permit for a well identified as the Yost 3H on May 27th, 2014. NNE has since leased an additional tract allowing for the extension of this well bore.

Therefore, please find enclosed an application to extend the Yost 3H well bore from a lateral length of 6,865' to 7,662'. Along with the application is a revised Well Bore Schematic, Site Safety Plan, Mylar Plat and Lease Information Form (WW-6A1).

Should you have any questions please contact me at 304.241.5752 Ext. 7108 or by email at hmedley@nne-llc.com.

Sincerely,

Hollie M. Medley
Regulatory Coordinator

4706101673
MOD

WW-6B
(9/13)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Northeast Natural Energy LLC | 494498281 (Operator ID) | Monongalia (County) | Clay (District) | Blacksville, WV (Quadrangle)

2) Operator's Well Number: Yost 3H Well Pad Name: Yost

3) Farm Name/Surface Owner: Yost Heritage Inc. Public Road Access: Daybrook Road 218

4) Elevation, current ground: 1,510' Elevation, proposed post-construction: 1485.2'

5) Well Type (a) Gas ■ Oil _____ Underground Storage _____
Other _____
(b)If Gas Shallow _____ Deep ■
Horizontal ■

MJK 9/12/14

6) Existing Pad: Yes or No No

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
Marcellus Shale, 8,050 TVD, 80', 3,500 PSI Formation Pressure

8) Proposed Total Vertical Depth: Pilot: 8,500' , Horizontal: 8,050'

9) Formation at Total Vertical Depth: Pilot: Heldersburg, Horizontal: Marcellus

10) Proposed Total Measured Depth: 15,821'

11) Proposed Horizontal Leg Length: 7,662'

12) Approximate Fresh Water Strata Depths: 300' ,1,150'

13) Method to Determine Fresh Water Depths: Driller's Log From Offset Wells

14) Approximate Saltwater Depths: 1,550' , 2,500'

15) Approximate Coal Seam Depths: 450' , 1,000'

16) Approximate Depth to Possible Void (coal mine, karst, other): NA

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes ☐ No ☑

(a) If Yes, provide Mine Info: Name: _____
Depth: _____
Seam: _____
Owner: _____

Received
SEP 15 2014
Office of Oil and Gas
WV Dept. of Environmental Protection

4706101673
MOP

WW-6B
(9/13)

18) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	New	NA	52.78	60'	60'	GTS
Fresh Water	13-3/8"	New	J-55	54.5	1,480'	1,450'	CTS
Coal							
Intermediate	9-5/8"	New	J-55	40	2,680'	2,630'	CTS
Production	5-1/2"	New	P-110	20	15,821'	15,775'	3,538
Tubing	2-7/8"	New	J-55	6.5	NA	8,000'	NA
Liners							

MJK 9/12/14

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	24"	0.25"	2,200	Grout	NA
Fresh Water	13-3/8"	17-1/2"	0.38"	2,730	Class A	1.23
Coal						
Intermediate	9-5/8"	12-1/4"	0.395"	3,950	Class A	1.3
Production	5-1/2"	8-3/4"	0.361"	12,530	50:50 Poz	1.21
Tubing	2-3/8"	NA	0.190"	7,700	NA	NA
Liners						

PACKERS

Kind:				
Sizes:				
Depths Set:				

4706101673

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drilling and completion of a horizontal Marcellus well. The well will be drilled on air to an approximate depth of 6,400' TVD/MD. After 6,400' a pilot hole will continue to be drilled vertically on fluid to an approximate depth of 8,500' TVD/MD. After geologic evaluation, wellbore will be plugged back with cement to approximately 6,400' TVD/MD. Well will be horizontally drilled from top of cement to approximately 8,050' TVD / 15,422' MD along a 345.6 degree azimuth.

from TD

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Multi-stage / high-rate slickwater fracture treatment using various size sands as proppant. First stage will be initiated via pressurization against a burst disc ran in the production casing string or perforated with coiled tubing. Subsequent stages will be perforated with pumped down guns ran on wireline. Individual stages will be isolated with composite frac plugs. Maximum pump rate during any stage will be 110 BPM with a maximum allowable surface pressure of 9,500 PSI. Composite bridge plugs will be set at the end of the last stage to isolate the treated formation. After fracture treatment, composite frac plugs will be drilled out using a service rig and/or snubbing unit.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 14.5

22) Area to be disturbed for well pad only, less access road (acres): 10.4

23) Describe centralizer placement for each casing string:

Surface and intermediate casing strings will have bow spring centralizers placed every third joint (~120') from shoe joint to surface. Production casing will have rigid body centralizers placed every fourth joint (~160') from TD to surface.

24) Describe all cement additives associated with each cement type:

Surface string cement will be a Type 1 + 3% bwoc Calcium Chloride + 0.75 gals/100 sack FP-12L + 51.2% Fresh Water blend. Intermediate string cement will be a Type I Cement + 0.5% bwoc EC-1 + 0.75 gals/100 sack FP-12L + 0.25 lbs/sack Cello Flake + 0.5% bwoc Sodium Metasilicate + 0.5% bwoc BA-10A + 50.9% Fresh Water. Production string cement will be (50:50) Poz (Fly Ash):Type I Cement with a gas migration additive.

25) Proposed borehole conditioning procedures:

Surface string will use a 35.0 bbls Gel Pill + LCM + 25 lbs Cello Flake + 20 lbs/bbl Bentonite + 80 lbs Fed Seal @ 8.4 ppg & 10 bbls fresh water spacer prior to cement. Intermediate string will use a 35.0 bbls Gel Pill + LCM + 25 lbs Cello Flake + 20 lbs/bbl Bentonite + 80 lbs Fed Seal @ 8.4 ppg & 10 bbls fresh water spacer prior to cement. Production string will use a 50.0 bbls SealBond 25 + 1 gal/bbl US-40 + 275 lbs/bbl Barite, Bulk + 1 gal/bbl SS-2 @ 13.5 ppg spacer prior to cement.

*Note: Attach additional sheets as needed.

4706101673

Northeast Natural Energy LLC Mine Contingency Plan

northeast
NATURAL ENERGY

On all wells drilled, Northeast Natural Energy LLC ("NNE") has contingency strategies in place should an unanticipated void or mine be encountered while drilling the surface section of the well. If encountered, any accumulated gases will be diverted a safe distance away from the drilling operations through the blooey line and/or flare.

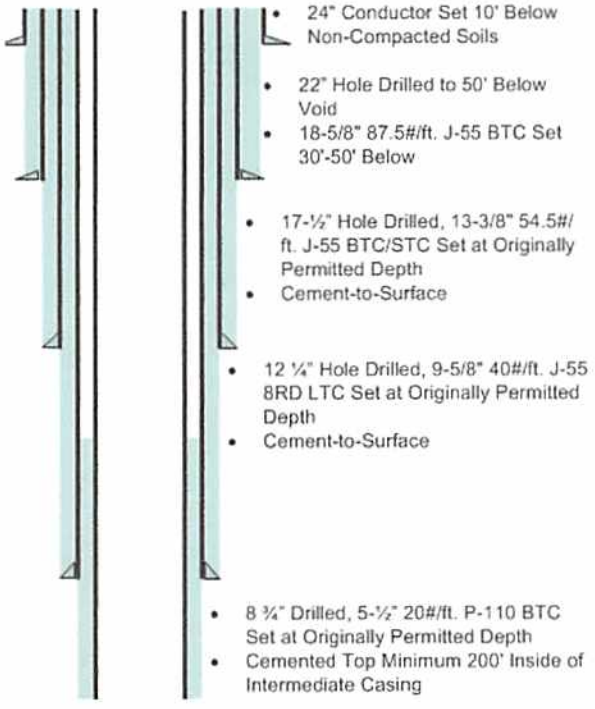
All casings programs submitted to the state incorporate the use of a 24" conductor over the previously used 20" that has long been the industry standard for a typical Marcellus design. The use of 24" conductor casing allows the use of a 22" bit to ream the surface hole, and drill 50' below the void to run a string of 18-5/8" 87.50#/ft J-55 through the section when needed.

The 18-5/8" would be set 30-50' below the void with cement baskets placed directly above and below. The section of pipe below the void would be cemented using the displacement method and 100% excess. The section above the void would be cemented simultaneously using a two-stage DV tool or separately by using remedial top fill techniques and 30% excess.

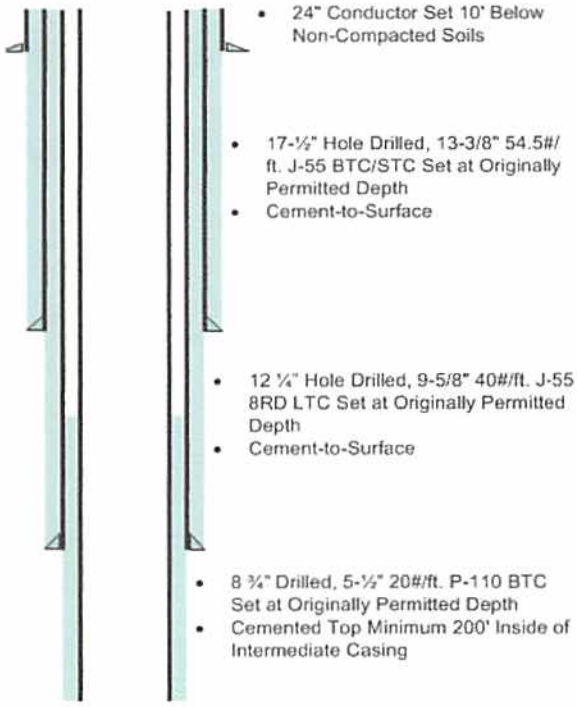
With the use of these string sizes and techniques, the surface and intermediate strings do not need to be altered. After a proper WOC time, the surface section of the well would continue to be drilled with a 17-1/2" bit and the 13-3/8" 54.50#/ft freshwater casing would be set at the originally permitted depth.

The diagram below visually shows the alternative casing plan should an unanticipated void be encountered.

Casing Schematic w/ Mine String



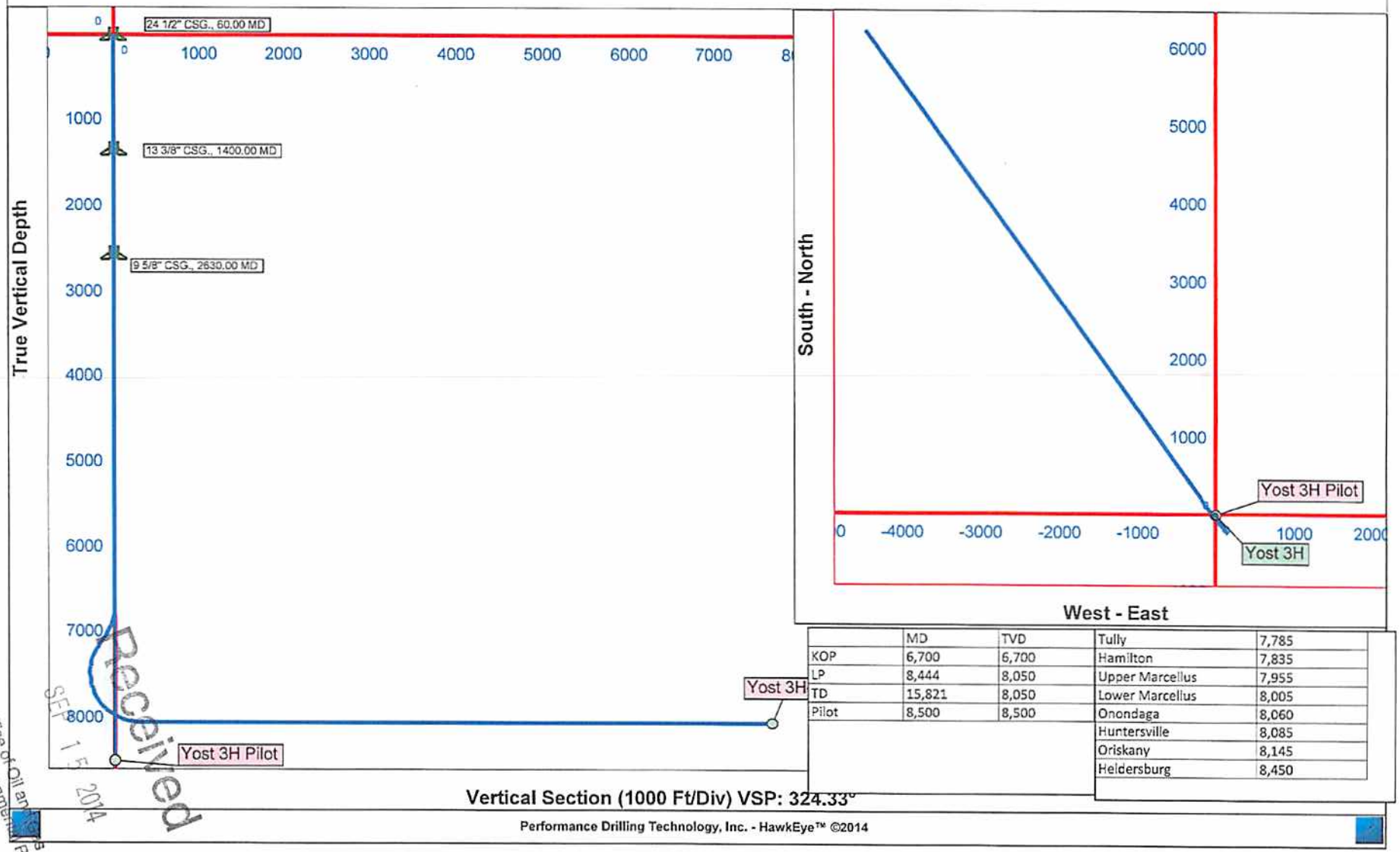
Casing Schematic w/o Mine String



05/14 - IC

Job Number: 2
Company: Northeast Natural Energy
Lease/Well: Yost 3H
Location: Yost
Rig Name: Pioneer 63
State/County: WV/ Mon
Country: US
API Number:

Elevation (To MSL): 1486.20 ft
RKB: 18.00 ft
Projection System: US State Plane 1983
Projection Group: West Virginia Northern Zone
Projection Datum: GRS80
Magnetic Declination: -8.86
Grid Convergence: -0.45797 W
Date: Thursday, September 11, 2014



	MD	TVD
KOP	6,700	6,700
LP	8,444	8,050
TD	15,821	8,050
Pilot	8,500	8,500

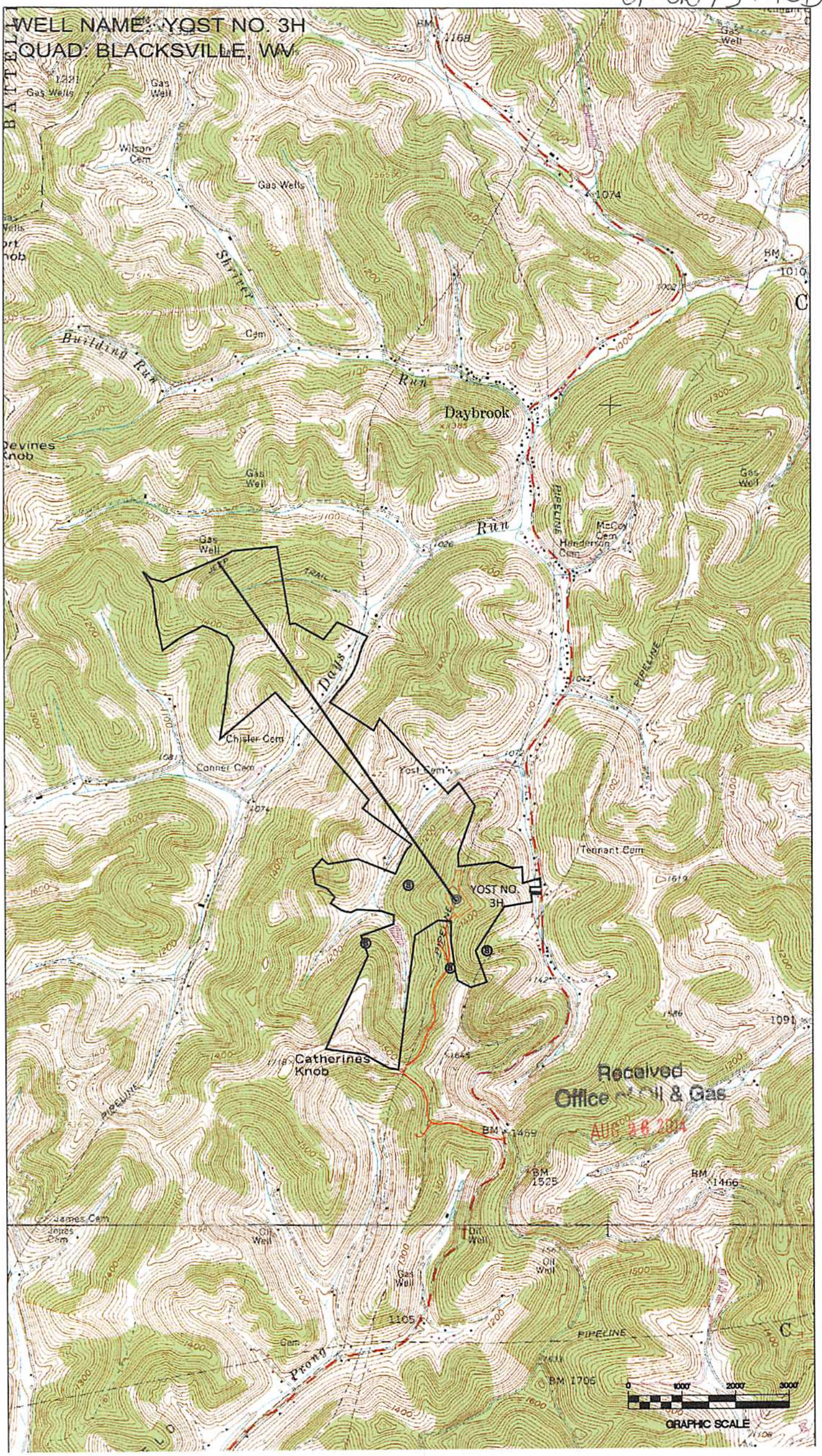
Tully	7,785
Hamilton	7,835
Upper Marcellus	7,955
Lower Marcellus	8,005
Onondaga	8,060
Huntersville	8,085
Oriskany	8,145
Heldersburg	8,450

Vertical Section (1000 Ft/Div) VSP: 324.33°

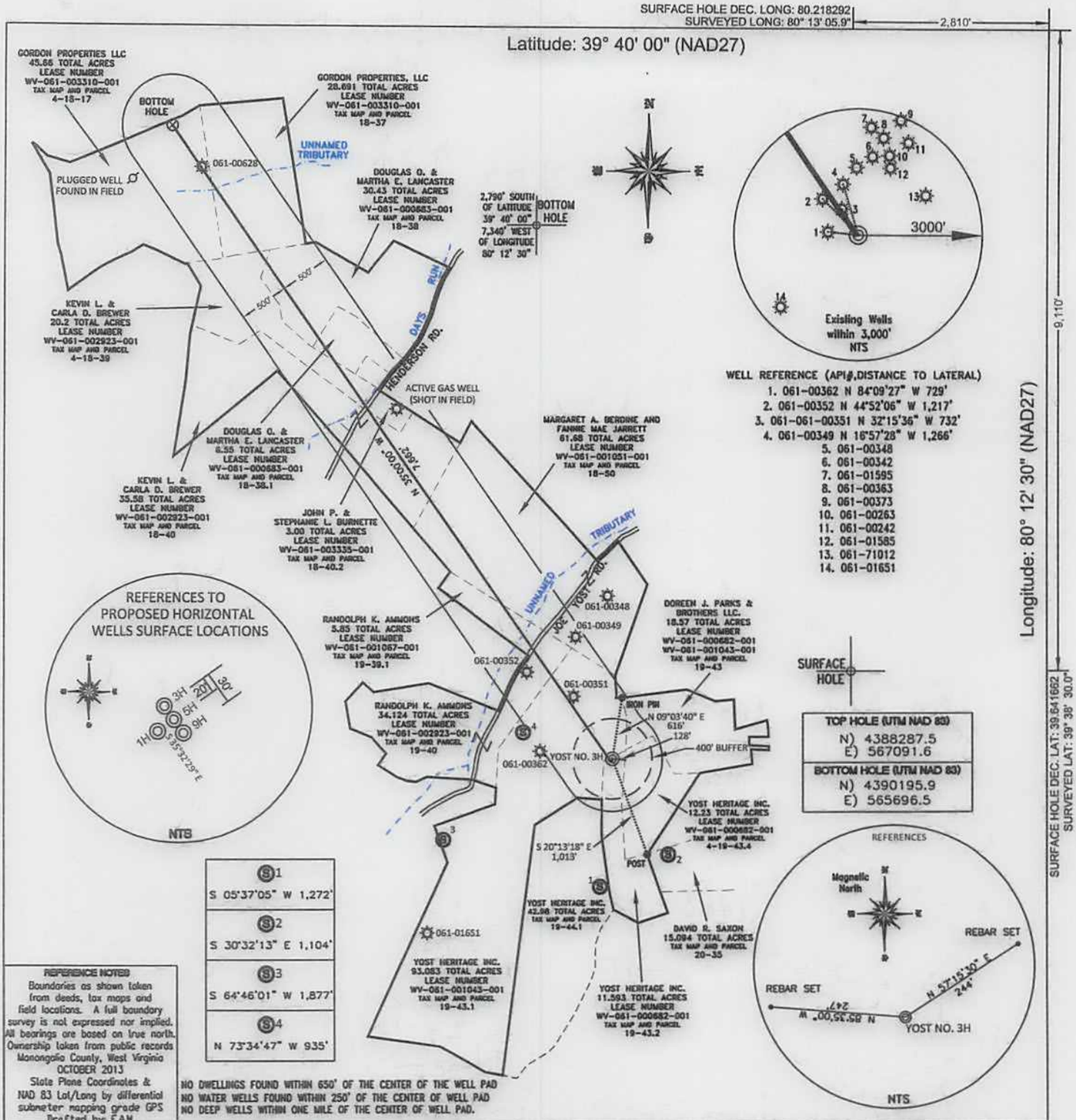
4706101673 Mod

GI-01673 MOD

WELL NAME: YOST NO. 3H
QUAD: BLACKSVILLE, WV



Received
Office of Oil & Gas
AUG 26 2014



FILE #: NNE10

DRAWING #: 2297

SCALE: PLAT - 1" = 1400'
TICK MARK - 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/200

PROVEN SOURCE OF ELEVATION: SUBMETER MAPPING GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: _____

L.L.S. #2124 : Ernest J. Benchek III

ERNEST J. BENCHEK III LICENSED No. 2124 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS

WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

DATE: AUGUST 8, 2014

OPERATOR'S WELL #: YOST NO. 3H

API WELL #: 47 (STATE) 61 (COUNTY) 01673 (PERMIT) H6A MOD

Well Type: ☐ Oil ☐ Waste Diposal ☐ Production ☒ Deep
☒ Gas ☐ Liquid Injection ☐ Storage ☐ Shallow

WATERSHED: DUNKARD CREEK
ELEVATION: 1,510'

COUNTY/DISTRICT: MONONGALIA / CLAY
QUADRANGLE: BLACKSVILLE, WV

SURFACE OWNER: YOST HERITAGE INC.
ACREAGE: 11.593 +/-

OIL & GAS ROYALTY OWNER: (SEE ATTACHMENT)
ACREAGE: 407.24 +/-

LEASE NUMBERS: _____

DRILL ☒ CONVERT ☐ DRILL DEEPER ☐ REDRILL ☐ FRACTURE OR STIMULATE ☒
PLUG OFF FORMATION ☐ PERFORATE NEW FORMATION ☐ PLUG & ABANDON ☐
CLEAN OUT & REPLUG ☐ OTHER CHANGE ☐ (SPECIFY): _____

TARGET FORMATION: MARCELLUS
ESTIMATED DEPTH: PILOT 8,500' TVD: 8,050' TMD: 15,821'

WELL OPERATOR: NORTHEAST NATURAL ENERGY LLC.
DESIGNATED AGENT: JOHN ADAMS

ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200
ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200

CITY: CHARLESTON STATE: WV ZIP CODE: 25301
CITY: CHARLESTON STATE: WV ZIP CODE: 25301